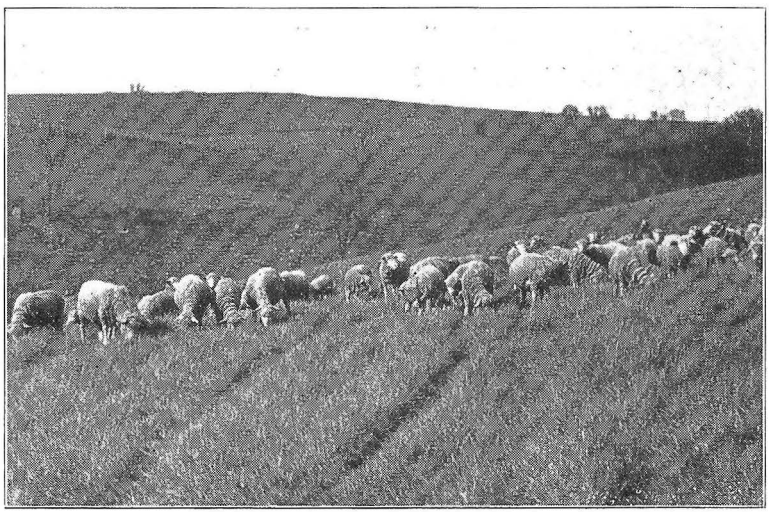
Special Circular Number 21

OHIO AGRICULTURAL EXPERIMENT STATION

EFFECT OF SYSTEMS OF FEEDING AND MANAGEMENT ON FLOCK RETURNS



SHEEP DAY

July 30, 1929

Southeastern Test Farm

Carpenter, Ohio

ACKNOWLEDGMENTS

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THE EFFECT OF VARIOUS SYSTEMS OF FEEDING AND MANAGEMENT ON THE RETURN MADE BY FINEWOOL FLOCKS UNDER SOUTHEASTERN OHIO CONDITIONS

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A change in the finewool sheep production practices followed in southeastern Ohio has been necessitated during recent years. Increased costs have made it unprofitable to keep sheep for their wool alone. Market lambs are essential if the flock is to make maximum returns.

In southeastern Ohio large areas of relatively cheap hilly land furnish grazing. Areas of tillable land suitable for the production of crops to be harvested and stored for use as winter feed are somewhat limited. The sheep raiser located in this district is anxious to learn the comparative return in lambs and wool from a flock when it is kept under various systems of feeding and management. He also wants to know what effect these various systems have on flock maintenance. On the basis of such figures he can conduct the business end of his sheep enterprise to his best financial advantage.

In 1924 the Ohio Agricultural Experiment Station started a test to determine the effect of various systems of feeding and management on flock production and maintenance. For this test four groups of 30 high grade Delaine Merino ewes each were selected. These ewes were kept at the Southeastern Test Farm of the Experiment Station and were maintained under the various systems of feeding and management outlined in Table 1.

In addition to the feeding and management scheme outlined in Table 1 several conditions pertinent to the experiment should be understood.

All female offspring were retained and developed on rations similar to those fed their dams. When these young females reached breeding age they were put to service as replacement ewes in the flock in which they were born and raised. Provision was made at the outset of the test to accommodate any increase in the size of the breeding flock that might accrue in any of the systems followed.

The wether lambs of each group were fattened for market and sold in the spring after shearing. Each year the groups were fed separately but under identical conditions and on similar rations in

TABLE 1.—PLAN OF EXPERIMENT

Flock number	Winter shelter	Breeding plan. Ewes bred to lamb—	Winter feeding plan for—			Summer feeding plan
			Ewes prior to lambing	Ewes after lambing	Nursing lambs	
1	Access to barn	On pasture during April and May	Legume hay Corn stover* Pasture‡	Ewes lamb on pasture. No harvested feeds used	Lambs born on pasture. No harvested feeds used	Pasture
2	Confined to barn with small outside lot adjoining	On pasture during April and May	Legume hay Corn stover* Corn silage	Ewes lamb on pasture. No harvested feeds used	Lambs born on pasture. No harvested feeds used	Pasture
3	Confined to barn with small outside lot adjoining	In the barn during February and March	Legume hay Corn stover* Corn silage	1 pound mixed grain daily per ewe Legume hay Corn silage	Limited amount‡ of mixed grain and legume hay fed in creep until ewes and lambs were turned to pasture	Pasture
4	Confined to barn with small outside lot adjoining	In the barn during February and March	Mixed grain daily per ewe, ½ lb. Legume hay Corn stover* Corn silage	Mixed grain daily per ewe, up to 1½ lb. Legume hay Corn silage	All the mixed grain and legume hay the lambs would consume fed in lamb creeps until ewes and lambs were turned to pasture	Pasture

*The limited amount of corn stover available on the farm was utilized by feeding it to the sheep as long as it lasted.

†The pasture grazed by the sheep of Flock 1 during the winter was prepared for winter use by allowing the grass to grow unmolested during September, October, and November.

‡The limited amount of grain allowed the nursing lambs in Flock 3 was one-third the amount consumed by the lambs of Flock 4 on the per-lamb basis.

Note: The yearling ewes and two-year-old ewes of Flock 4 were fed 1 pound of mixed grain daily per head during the winter feeding period. The female offspring of Flock 3 were fed ½ pound mixed grain daily per head during the winter feeding period.

order that any difference in their feed-lot performance could be interpreted as reflecting the system under which the lambs were born and reared.

Any influence different lines of breeding might have on the groups was eliminated as far as possible by maintaining a similar mating schedule for each flock.

TABLE 2.—SUMMARY OF EWES

Average of years, 1924-25, 1925-26, 1926-27

	Flock 1	Flock 2	Flock 3	Flock 4
Yearly feed consumption per ewe:				
Grain* ... . Pounds..	.....	.....	66	117
Hay..... Pounds..	381	222	234	231
Silage..... Pounds..	.....	413	404	403
Stover..... Pounds..	51	45	41	40
Straw (bedding)..... Pounds..	48	52	69	69
Salt..... Pounds..	5.5	6.6	6.6	5.9
Pasture (summer†) ..... Days..	179	172	185	185
Pasture (winter†)..... Days..	186	89	35	35
Total yearly cost of feed per ewe.....	$5.07	$4.53	$5.70	$6.58
Annual depreciation and death loss per ewe in flock‡.	$1.50	$1.28	$0.96	$0.88
Annual wool credit per ewe	$3.68	$3.58	$3.47	$3.76
Ewe cost to be charged against lambs§.....	$2.89	$2.23	$3.19	$3.70
Ewe cost per lamb (basis living lambs December 1)...	$4.82	$3.59	$3.95	$4.42
Yearly flock returns per ewe over feed cost	$1.18	$1.73	$3.38	$3.40

The feed prices used were as follows: Shelled corn $0.84 a bushel; whole oats $0.55 bushel; linseed oil cake (pea size) $55.00 ton; hay $15.00 ton; silage $5.00 ton; stover $4.00 ton; straw $6.00 ton; salt $20.00 ton; summer pasture $0.007 per ewe-day; $0.002 per lamb-day; $0.005 per yearling ewe-day; winter pasture $0.0035 per ewe-day; $0.002 per lamb-day; $0.003 per yearling ewe-day.

*Grain mixture consisted of 3 parts corn, 3 parts oats, and 1 part linseed oil cake—parts by weight.

†Summer pasture included all pasture between May 15 and November 15.

‡Beginning inventory plus cost of additions less sales and closing inventory.

§Feed cost of ewes plus depreciation and less wool sales, divided by number of ewes.

All flocks were treated regularly once each month during the summer for stomach worms. The lambs received their first treatment at weaning time. Copper sulfate solution, which the Station has found effective, was used as the drench.

COMPUTATION OF RESULTS

Brief summaries of the data collected from these four flocks of test sheep are presented in tabular form in Tables 2 and 3. In making the financial computations the actual prices received for fat lambs and wool sold were used. Inventory values on the basis of age were assigned to the breeding ewes at the start and close of each sheep year. These values were as follows:

2 year old ewe	$11.00
3 year old ewe	$10.00
4 year old ewe	$ 9.00
5 year old ewe	$ 7.00
6 year old ewe	$ 5.00
7 year or older ewe	$ 3.00

This inventory system took care of the item of credit for cull ewes removed but did not allow for merit of the ewe to enter. Any increase or decrease in the quality of the flock does not reflect in the figures given in the table except as this affected the production of the flock. Pride that comes thru ownership of quality stock really should have a place in the reckoning.

RESULTS

Lamb production was necessary in every flock, since the sum of the items "Yearly Feed Cost Per Ewe" and "Annual Depreciation and Death Loss Per Ewe" was in excess of the sale value of the wool produced by the ewes.

TABLE 3.—LAMB SUMMARY

Average of three years

	Flock 1	Flock 2	Flock 3	Flock 4
Percent of lambs:				
Born to ewes in flock	85	89	101	97
Dying during first 10 days	9	12	16	11
Weaned to ewes in flock	69	70	82	85
Raised to December 1, to ewes in flock	57	59	80	84
Raised to December 1, to lambs born	67	66	79	86
Average weights:				
Lambs at birth	7.6	7.1	7.7	8.5
Lambs at weaning	34.7	34.5	42.2	47.0
Lambs December 1	44.4	41.8	50.9	55.7
Yearling ewes (end sheep year)	66.0	64.9	67.1	74.2
Two year old ewes (end of sheep year)	89.6	87.8	85.6	95.7
Wether lambs when sold (sheared)	78.6	74.8	86.2	94.5
Pounds of lamb raised per ewe:				
To weaning (comparable age)	23.8	24.1	34.4	39.8
To December 1	25.4	24.7	40.5	46.6
Cost of feed:				
Per lamb to December 1	.60	.58	.73	.93
Per fattening wether lamb (153 days)	4.45	4.42	4.92	5.19
Per ewe as yearling	3.83	3.43	3.95	5.48
Per ewe as two year old	5.67	5.13	5.01	6.50
Wool credits:				
Per fattening wether lamb	2.38	2.30	3.21	3.73
Per yearling ewe	2.20	1.82	2.79	3.29
Per two year old ewe	3.31	2.75	3.39	4.12
Lamb meat receipts per wether lamb sold	10.58	10.01	11.76	12.96
Returns* per $1.00 worth of feed:				
Fed to ewes for replacement	1.11	1.37	1.39	1.14
Fed to wether lambs for market	1.58	1.70	1.92	2.00
Returns* over feed cost:				
Per young ewe retained	1.07	2.57	3.49	1.91
Per wether lamb marketed	2.92	3.52	5.25	6.13

*Wool sales plus closing inventory value ($11.00 per ewe) or lamb sales, less ewe charge against lambs.

That lamb production in the flocks was directly influenced by the system of feeding and management practiced is shown under the first three major items in Table 3. Good nutrition for the pregnant and nursing ewe was essential in order for her to give

maximum lamb returns. Good nutrition was also essential for the lambs in order for them to exercise fully their inherent growing and fattening tendencies. Even tho the better feeding and management practices resulted in higher feed costs for Flock 4 the superior lambs which were raised carried the increased burden of expense to the best financial advantage for the owner.

Numerous factors contribute to create this situation and it seems important that considerable space be devoted to a discussion of them.

DISCUSSION

The good plane of nutrition in effect in Flock 4, due to the fairly liberal use of concentrates thruout the winter months, fitted the ewes for maternity. Strong, vigorous lambs were dropped and the ewes nursed them well. The lambs were thus given a good start.

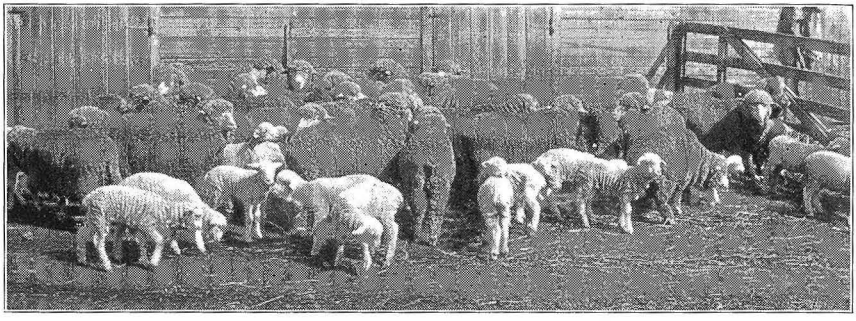
By comparing the figures showing the infant mortality in Flocks 3 and 4 the importance of fitting the pregnant ewes for parenthood by allowing them some grain before lambing is apparent. The higher infant mortality in Flock 3 reflects the reduced vigor of the lambs and the poorer milking qualities of the ewes.

The practice of having the ewes drop their lambs on grass appeared to reduce the mortality among the new-born lambs as some sheep raisers contend. The data from Flock 2 seem to be contradictory, altho an explanation for the higher mortality among the new-born that occurred in this flock may be found in the fact that the feed for the ewes was changed with the advent of lambing. Perhaps there was a lowering of the plane of nutrition due to the removal of silage which contained some corn and the substitution of pasture.

It was surprising to note the apparent carry-over effect of good winter feeding on the condition of the ewes during the Summer. It must be that there was a stored-up reserve effected by good winter rations. In support of this we suggest that it scarcely seems possible for the few pounds of additional feed supplied the lambs of Flock 4 over Flock 3, and given to the lambs in creeps, to result in a 5 pound heavier lamb at weaning. It takes ewe's milk to promote growth in nursing lambs and we credit the major portion of this additional 5 pounds to the better milking qualities of Flock 4 ewes made possible by the better winter feeding scheme. If this credit be true then the mortality that occurred among the lambs of Flocks 1 and 2 must have been due in part to the poor

milking qualities of the ewes, which in turn kept these lambs from exercising fully their inherent growing tendencies and caused them to fall prey to parasites and disease.

Too much stress should not be placed upon the factor of time of lambing. Equipment should be the regulating factor to determine the time the lambs should arrive. It is apparent, however, that too rigid feed economies practiced on the flock that lambed late was hazardous.



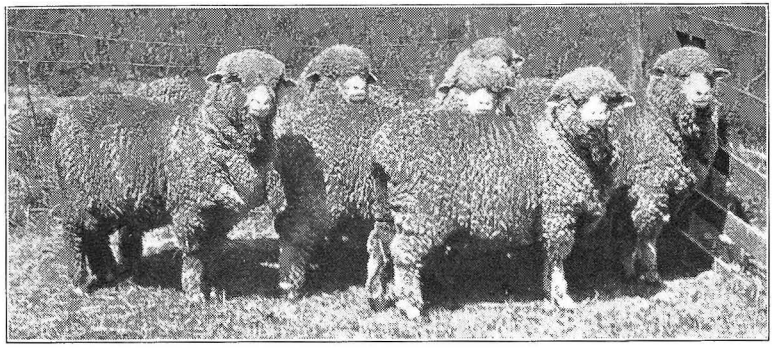
Ewes and lambs of Flock 4

The feed-lot performance of the wether lambs reflected the system of feeding and management under which the lambs were born and reared. Wether lambs of Flock 1 made the lowest average daily gain per lamb while those of Flock 4 made the highest. In order were the lambs of Flocks 2 and 3 in perfect "step-ladder fashion". In Flocks 1 and 2 the lambs were approximately two months younger, which gave them a possible growth factor in their favor. This contributed to make the cost of gain for the different groups not significantly different.

The young ewes developed with a rapidity proportional to the feed they consumed. The average weights as shown in Table 3, however, do not do justice to the possibilities that accrued to the more rapid development of the Flock 4 ewes. More than enough ewes, sufficiently developed to take their place in the breeding flock, could have been selected as yearlings to replace the culls removed if no increase in the ewe-flock numbers had been desired. Such a plan would have released more lambs for the fattening lot, which branch of the business, according to the last item in Table 3, offers the greatest opportunities for increasing the flock returns. Such possibilities do not present themselves in Flocks 1 and 2. It was necessary in both flocks to save all of the female offspring in order

to keep up the number of ewes in the breeding flocks. As an interesting point it might be mentioned here that at the end of five years Flock 1 contains only 29 ewes, whereas 30 was the initial number. Flock 4 has increased to 44 ewes, without the possible benefits to be derived by breeding the well developed yearlings.

The number of ewes that died in each flock during the three years of the experiment is not shown in the tables. These figures were: for Flock 1, 9 ewes; for Flock 2, 8 ewes; for Flock 3, 2 ewes; and for Flock 4, no mortality. These figures tell their own story of the effect the feeding and management practices had on the maintenance of numbers of ewes in the four breeding flocks. It should be understood that these death losses do reflect in the financial computations under the heading "Annual Depreciation and Death Loss Per Ewe in the Flock."



Two year old ewes of Flock 4

The strict economies in the amount of harvested feeds used in the winter ration of Flocks 1 and 2 shortened the length of the productive life of the ewes. The culling records show that in these two flocks it was extremely rare to find a ewe useful for breeding above 7 years of age. When these ewes became 7 years old their teeth were either loose, broken, or lost entirely and their bodies emaciated as a result. In Flock 4, where liberal use was made of harvested feeds during the winter time, useful ewes were removed that were 10 years old. Just how much longer these ewes would have continued useful remains an open question. If we add these years saved to the possible additional year gained by breeding yearlings the conclusion is that the good winter feeding system nearly doubled the length of the productive life of the ewe.

Annual wool credit per mature ewe was not markedly different for the various flocks. The ewes were comparable at the start of the test and marked variation in wool credits would not be expected for two or three years. That variations will come about as the test progresses and replacement ewes developed under each system are added is apparent from the item "Wool Credits" in Table 3.

Flock 4, even tho all of the benefits following as a result of the better feeding and management plan did not find expression, made the largest financial yearly return per ewe over feed cost.